CLAIMS

1. A wireless remote control unit for use with a low noise UV photodetector comprising:

a UV LED that emits light having a dominant wavelength below about 400 nm;

a microprocessor connected to the LED for controlling the emitted light; and

an energy storage device for storing electrical energy and for powering the LED and the microprocessor.

2. The remote control unit of claim 1, wherein the LED emits light having a dominant wavelength below about 320 nm.

3. The remote control unit of claim 2, wherein the LED emits light having a dominant wavelength below about 280 nm.

4. The remote control unit of claim 1, wherein the light emitting diode generates less than about 1 milliWatt of UV light energy during communication with the photodetector at a distance of up to about 10 meters.

5. The remote control unit of claim 4, wherein the light emitting diode generates less than about 1 microWatt of UV light energy during communication with the photodetector at the distance.

6. The remote control unit of claim 5, wherein the light emitting diode generates less than about 1 nanoWatt of UV light energy during communication with the photodetector at the distance.

7. The remote control unit of claim 6, wherein the light emitting diode generates less than about 1 picoWatt of UV light energy during communication with the photodetector at the distance.

8. The remote control unit of claim 1, wherein the light emitting diode generates less than about 1 milliWatt of UV light energy during communication with the photodetector at a distance of up to about 100 meters.

9. The remote control unit of claim 8, wherein the light emitting diode generates less than about 1 microWatt of UV light energy during communication with the photodetector at the distance.

10. The remote control unit of claim 9, wherein the light emitting diode generates less than about 1 nanoWatt of UV light energy during communication with the photodetector at the distance.

11. The remote control unit of claim 1, wherein the light emitting diode generates less than about 1 milliWatt of UV light energy during communication with the photodetector at a distance of up to about 1000 meters.

12. The remote control unit of claim 11, wherein the light emitting diode generates less than about 1 microWatt of UV light energy during communication with the photodetector at the distance.

13. The remote control unit of claim 12, wherein the light emitting diode generates less than about 1 nanoWatt of UV light energy during communication with the photodetector at the distance.

14. The remote control unit of claim 1, further comprising a transducer that converts a non-electrical energy source into the electrical energy.

15. The remote control unit of claim 14, wherein the non-electrical energy source is selected from a group consisting of a sound wave, a light wave, an elevated temperature source, and a pressure source.

16. The remote control unit of claim 14, wherein the transducer is selected from a group consisting of a piezoelectric crystal, a microphone, and a photoelectric cell.

17. The remote control unit of claim 1, wherein the energy storage device comprises a capacitor for storing electrical charge temporarily, wherein the capacitor comprises at least two metallic elements separated and insulated from each other by a dielectric material.

18. The remote control unit of claim 17, wherein the capacitor has a capacitance less than about 800 microfarads and wherein the energy storage device does not comprise a battery selected from a group consisting of a sealed Lead acid battery, a Nickel-Cadmium battery, a Nickel-Metal Hydride battery, a Lithium ion battery, a Zinc-air battery, a flooded Lead acid battery, and an Alkaline battery, and any combination thereof.

19. The remote control unit of claim 1, wherein the energy storage device comprises a battery, wherein the battery is selected from a group consisting of a sealed Lead acid battery, a Nickel-Cadmium battery, a Nickel-Metal Hydride battery, a Lithium

ion battery, a Zinc-air battery, a flooded Lead acid battery, and an Alkaline battery, and any combination thereof.

20. The remote control unit of claim 1, wherein the remote control unit is programmed to control a television, a garage door opener, a cordless telephone, and any combination thereof.

21. An optical communication system comprising:

a UV light source that emits light having a wavelength below about 400 nm;

a first microprocessor coupled to the light source for controlling the light source;

a UV photodetector that detects light having a wavelength below bout 400 nm and generates an electrical signal responsive to the detected light, wherein the detector has a dark current at room temperature of less than about 1×10^{-9} A/m^2; and

a second microprocessor coupled to the photodetector for receiving and interpreting the electrical signal.

22. The system of claim 21, wherein the dark current is less than about 1×10^{-12} A/m^2.

23. The system of claim 22, wherein the dark current is less than about 1×10^{-15} A/m^2.

24. The system of claim 23, wherein the dark current is less than about 1×10^{-18} A/m^2.

25. The system of claim 21, wherein the source emits light having a wavelength below about 320 nm.

26. The system of claim 25, wherein the source emits light having a wavelength below about 280 nm.

27. The system of claim 25, wherein the source generates less than about 1 milliWatt of UV light energy during communication with the photodetector at a distance of up to about 10 meters.

28. The system of claim 27, wherein the source generates less than about 1 microWatt of UV light energy during communication with the photodetector at the distance.

29. The system of claim 28, wherein the source generates less than about 1 nanoWatt of UV light energy during communication with the photodetector at the distance.

30. The system of claim 29, wherein the source generates less than about 1 picoWatt of UV light energy during communication with the photodetector at the distance.

31. The system of claim 21, wherein the source generates less than about 1 milliWatt of UV light energy during communication with the photodetector at a distance of up to about 100 meters.

32. The system of claim 31, wherein the source generates less than about 1 microWatt of UV light energy during communication with the photodetector at the distance.

33. The system of claim 32, wherein the source generates less than about 1 nanoWatt of UV light energy during communication with the photodetector at the distance.

34. The system of claim 21, wherein the source generates less than about 1 milliWatt of UV light energy during communication with the photodetector at a distance of up to about 1000 meters.

35. The system of claim 34, wherein the source generates less than about 1 microWatt of UV light energy during communication with the photodetector at the distance.

36. The system of claim 35, wherein the source generates less than about 1 nanoWatt of UV light energy during communication with the photodetector at the distance.

37. The system of claim 21, further comprising an energy storage device coupled to at least the first microprocessor for storing electrical energy and powering the source.

38. The system of claim 37, further comprising a transducer that converts a non-electrical energy source into electrical energy for storage in the energy storage device.

39. A material detector comprising:

at least one light emitting diode that emits UV light;

at least one UV photodetector that detects the light and generates at least one electrical signal that is indicative of the amount of the light being detected; and

a microprocessor coupled to at least the at least one photodetector for receiving the electrical signal, wherein the microprocessor is programmed to analyze the signal to determine whether any material is present between the at least one diode and the at least one photodetector, and to generate an alarm signal when the material is determined to be present.

40. The material detector of claim 39, wherein the material is selected from a group consisting of a gas, a fluid, a solid, a colloidal solution, smoke, vapor, and any combination thereof.

41. The material detector of claim 40, further comprising an optical filter between a first of the diodes and a first of the photodetectors.

42. The material detector of claim 41, wherein the optical filter is selected from a group consisting of a bandpass filter and a lowpass filter.

43. The material detector of claim 41, wherein the at least one photodetector comprises a plurality of photodetectors.

44. The material detector of claim 43, wherein the electrical signal generated by each of the plurality of photodetectors has a signal level and wherein the microprocessor analyzes each of the electrical signal by comparing these levels to each other.

45. The material detector of claim 44, wherein the microprocessor is programmed to compare the levels of the electrical signals from photodetectors that are located within a single room and, based on that comparison, determine whether the material is present.

46. The material detector of claim 40, wherein the microprocessor is programmed to determine whether the electrical signal levels change in a way that is consistent with the presence of a fire.

47. The material detector of claim 40, wherein the alarm signal includes location information regarding the photodetector that generated the electrical signal that caused the alarm signal to be generated.

48. The material detector of claim 47, wherein the microprocessor further comprises a memory unit with a lookup table containing the location information.

49. The material detector of claim 40, wherein the electrical signal has a signal level and wherein the microprocessor analyzes the electrical signal by determining whether the signal level meets at least one criterion selected from a group consisting of the signal level being above a threshold level, the signal level being below the threshold level, and the signal level being different from the threshold level.

50. The material detector of claim 40, wherein the electrical signal has a signal level and wherein the microprocessor analyzes the electrical signal by determining whether the signal level changes in a predetermined way selected from a group consisting of changing by a predetermined amount, changing in a predetermined direction, and a combination thereof.

51. The material detector of claim 40, wherein the at least one diode comprises a plurality of diodes.

52. The material detector of claim 40, further comprising at least one mirror located along an optical path connecting the at least one diode and the at least one photodetector.

53. The smoke detector of claim 39, wherein the microprocessor is programmed to distinguish between the materials by monitoring the time derivative at which the at least one electrical signal changes.

54. The smoke detector of claim 53, wherein the microprocessor is programmed to distinguish between the object and the smoke.

55. A traffic detector comprising:

at least one light emitting diode that emits UV light having a wavelength shorter than about 310 nm;

at least one UV photodetector that detects the light and generates at least one electrical signal that is indicative of the amount of the light being detected; and

a microprocessor coupled to at least the at least one photodetector for receiving the electrical signal, wherein the microprocessor is programmed to analyze the signal to determine whether an automobile is present between the at least one diode and the at least one photodetector, and to generate a trigger signal when the automobile is determined to be present.

56. A traffic detector comprising:

at least one light emitting diode that emits UV light having a wavelength shorter than about 310 nm;

at least one UV photodetector that detects the light and generates at least one electrical signal that is indicative of the amount of the light being detected; and

a microprocessor coupled to at least the at least one photodetector for receiving the electrical signal, wherein the microprocessor is programmed to analyze the signal to determine whether an automobile is present between the at least one diode and the at least one photodetector, and to generate a trigger signal when the automobile is determined to be present.

57. An aircraft collision avoidance system for a plurality of aircraft, wherein the system comprises a transceiver that is mountable on each of the plurality of aircraft, and wherein each transceiver comprises:

at least one light emitting diode that emits a first UV light wave having a wavelength shorter than about 310 nm;

a first microprocessor for modulating the first light wave and encoding the first light wave with first location information;

a UV photodetector that detects a second UV light wave that was previously encoded with second location information on another aircraft and generates an electrical signal in response to detecting the second UV light wave; and

a second microprocessor, which is connected to the photodetector, programmed to decode the second location information, compare the first location information with the second location information, and generate a revised flying schedule.

58. The aircraft collision avoidance system of claim 57, further comprising an array of separately controllable mirrors, wherein the at least one light emitting diode is directed toward the array and the first microprocessor is electrically coupled to the array such that the first microprocessor modulates the position of the mirrors, thereby causing the first light wave to be encoded.

59. The aircraft collision avoidance system of claim 58, wherein the first microprocessor modulates the position of the mirrors at a rate that is greater than 1 MHz.

60. The aircraft collision avoidance system of claim 59, wherein the first microprocessor modulates the position of the mirrors at a rate that is greater than 1 GHz.

61. The aircraft collision avoidance system of claim 60, wherein the first microprocessor modulates the position of the mirrors at a rate that is greater than 1 THz.

62. The aircraft collision avoidance system of claim 57, further comprising an array of separately controllable mirrors, wherein the second microprocessor is programmed to orient the position of the array such that the second UV wave reflects from the array and optimizes the signal generated by the at least one photodetector.